International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 09 | September - 2022 Impact Factor: 7.185 ISSN: 2582-3930

A REVIEW STUDY ON TWINS FACE IDENTIFICATION USING LBP TECHNIQUE

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ABSTRACT: A user's identify & emotional condition can be inferred a great deal from their face. Face recognition affects vital applications in numerous fields, including recognition for police departments, identification for banking and security system access, and identifying information, amongst many others. It is a fascinating and difficult topic. The three key components of our study project are face depiction, feature extraction, & classification. The subsequent methods for identification and recognition are determined by the face recognition, which represents how to model a face. In the feature extraction stage, the facial image's most beneficial & distinctive traits are retrieved. The face image is compared to database pictures throughout the classification process. This paper concludes that the we empirically evaluate face recognition which considers both shape and texture information to represent face images based on Local Binary Patterns for person-independent face recognition. The face area is first divided into small regions from which Local Binary Patterns (LBP) are extracted and concatenated into a single feature vector. This feature vector forms an efficient representation of the face and is used to measure similarities between images.

Keywords: Face recognition, local binary pattern (LBP), feature extraction, classification.

I. INTRODUCTION

A person's identity & emotional condition could be inferred a great deal from their face. Face recognition affects vital applications in numerous fields, including recognition for law enforcement, authentication for banking and security system access, and identifying information, amongst many others. It is a fascinating
and difficult topic. The three key components of our study project are face reconstruction, feature extraction, & classification. The subsequent methods for detection and identification are determined by the face recognition, which represents how to model a face. The face is the most helpful and is used to compare how similar two photographs are. One of the most effective, direct, & natural ways for people to convey their emotions & intentions is through their faces. Facial recognition software affects vital apps in many fields, including

recognition for police departments, identification for banking or security system access, as well as personal identity, among others [1]. Face recognition is an intriguing and difficult topic. Our human connections heavily rely on the face to communicate identification & emotion. The capacity for face recognition in humans is astounding. Person identification is crucial to modern society for a number of reasons. Face recognition has long been a prominent area of study attention due to its non-intrusive nature and widespread use as a form of identification.

The organization of the paper is arranged as follows. In section II describes the paradigm of the face recognition. Section III contain the Local Binary Patterns. Section IV gives the literature Survey. Section Vends the paper with conclusion followed by references.

II. The Paradigm of the Face Recognition

Even though there are currently several commercial facial recognition methods in use, this method of identification remains a fascinating subject for academics. This is because the existing systems work well in environments that are relatively straightforward as well as monitored, but they significantly underperform in environments where there are variations in numerous parameters, like pose, viewpoint, facial expressions, time (when the pictures are taken), as well as illumination (lighting changes)[2]. The goal of this study is to develop a robust face recognition system while reducing the impact of these elements. Figure 1 depicts a facial recognition system.

Fig.1 Flow diagram of the stages involved in a face recognition system[2]

Face recognition could be used to identify people, and there are three basic steps in the process (figure 1). Face representation, feature extraction, or categorization fall within this category [3]. The initial challenge is to describe a face, which is known as face recognition. The subsequent methods for detection and recognition are determined by the representation of a face. The given image is modified (scaled & rotated) until it has the same "orientation" as the photos from the collection for entry-level recognition, which determines whether or not the image suggests a face. The most beneficial and distinctive aspects (properties) of the facial image are removed during the feature extraction phase. The face image is contrasted to the database's photographs using these

acquired characteristics. The face information is displayed to the database's photographs using these acquired characteristics. During the categorization step, this is performed [4]. The identification of the face image from the database with the highest matching score and, consequently, the fewest variations from the input face image is the result of the classification stage. To assess whether the variations are negligible enough, a threshold value could also be employed. After all, it's possible that a specific face is completely absent from the dataset.

III. Local Binary Patterns

To conduct biometric technology, there are several methods for removing the most advantageous properties from (preprocessed) face photos. The LBP approach is one of those used to features extracted. Ojala et al. [5] developed this relatively new strategy in 1996. A digital image's texture & shape could be described using LBP. In order to do this, an image is divided into a number of tiny sections, from which the features are retrieved.

The surrounding of the pixels in the areas are described by binary patterns that make up these features. The regions' collected features are combined into a single feature histogram, which serves as an image representation. The gap among histograms of the images can then be employed to evaluate them. Numerous investigations [6] have found that the LBP method of face recognition yields very excellent results in terms of speed & discrimination ability. The approach appears to be quite resistant to face photographs with varying facial gestures, various lighting circumstances, image rotation, or ageing of people because of the way the texture & shape of images are represented.

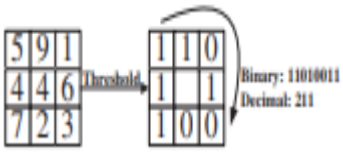

Figure 2. The basic LBP operator[6].

IV.LITERATURE REVIEW

Kamencay et al.,(2017) suggested a CNN-based face recognition device. To carry out the experiments as well as verify their findings, the authors used the OLR set of data, which contained 400 different entities (40 categories/10 images for each classification). The proposed technique's detection accuracy was compared to three different popular image segmentation techniques: PCA, LBPH, and KNN. In contrast to these approaches,

the suggested CNN-based approach outperforms them all, with a detection performance of approximately 98.3%[7].

Karthik et al.,(2017) It is suggested to develop and evaluate SVM classifier configurations for a real-time face recognition using Histogram of Oriented Gradient characteristics. To evaluate the system performance designed, AT&T's face dataset is first regarded, accompanied by performance review using real-time face inputs from the system camera. Using the new method, 81.25 î 97.00% recognition accuracy was achieved, as well as the proposed architecture could be easily added for numerous other pattern recognition systems as well[8].

Li et al.,(2019) suggested a framework thermal face recognition method based on physiological data Data pre - processing, FE, classification are all element of the training step. To start, using the Bayesian approach, the human face could be represented from the background of a thermal image as well as normalized to uniform size. As a feature vector, a grid of 22 thermal points is derived. Linear SVM Classifier is trained using these 22 derived points (linear SVC). The support vectors are calculated and used by the classifier to discover the hyper-plane for categorization. For face recognition, a feature vector from the test image is fed into the classifier. Our involvement is that the suggested method uses temperature information in face recognition for the first time. The experiments show the efficacy of the proposed technique[9].

Vengatesan et al.,(2019) The issue of differentiating identical twin images has been addressed using cutting-edge systems and procedures. GLCM as well as SVM techniques are most useful for detecting twins with every single distinct thought, and these processes could provide the foundation for recognizing twins by utilizing designs. The normal precision was 79.82% after two seconds of viewing the image incorporates. Designers see that increasing the review time fundamentally improves the level of coordination accuracy. The simulation result using the proposed methodology showed a good result for identical twins with correlation of r=1, which isn't difficult to distinguish utilizing other biometric advancement[10].

Bhargavi et al.,(2020) Face identification using Haar features is accomplished using the AdaBoost Method. The face of the input image is identified by this method. In both the test and training phases, the PZM as well as DoG approaches are used to features extracted from the face area discovered by the Proposed technique as well as store them in datasets. By trying to compare both trained as well as tested features, the SVM classifier

differentiates the twin's features & recognizes the culprit who is needed as a outcome. The experiments showed the suggested method's ability to identify a couple of identical twins[11].

Ahmad et al.,(2019) To distinguish identical twins, research suggested a deep CNN with a triplet error function. Designers used a hybrid method that combined the deep CNN design, which understands an encoding from facial images into Euclidean space, as well as the triplet loss function, which evaluates the L2 distance among facial images into Euclidean space. The procured L2 distance indicates the level of similarity among corresponding faces. Designers used 2 distinct CNN architectures on our raw pixel images, as well as different methods to decrease over fitting, such as dropout and batch normalization, as well as L2 regularization. Suggested technique has the highest mean validation accuracy of more than 87.2%[12].

Sujay et al.,(2017) For performance monitoring, the FERET as well as Yale databases are taken into account. Color to grayscale conversion as well as resizing are used for pre-processing. The Viola-Jones algorithm is used to extract the face portion of the image, and 15 rotations such as 0 degree as well as + & - 7 degrees are rotated before the image is split into 3x3 sub blocks for LBP application. To retrieve the final characteristics, the LBP histogram is produced. The SVM classifier is used to determine whether or not a match exists. FAR, FRR, TSR, and EER are relevant certification that are assessed. The maximum TSR value is 100%, as shown by the the tabulated results as well as graph. When the optimised Match Count is 10.8, the Equal Error Rate is 10.2%, and the Total Success Rate is 93.33% for the Yale dataset, which consists of various variants in image database. The achievement of the Yale database outperforms that of the FERET database[13].

Irawan et al.,(2020) introduced image classification simulation using SVM as the classifier as well as Histogram of Gradient as the feature representation. This study demonstrates that using SVM on HoG could compete with popular image techniques for pattern recognition like neural nets. It is not always essential to have complicated maths as well as methods in order to achieve desirable results in multi-face recognition. The SVM model created by the SVM learner node to predict the output from SVM Predictor has a predictive performance of only 87.5% for those studies[14].

Islam et al.,(2017) introduced the achievement of the SVM, CNN, and ANN for face recognition using BoW, HOG, and IP. Machine learning nears such as SVM, CNN, and ANN have been used for pattern identification, particularly in face recognition technology. Image feature extraction employs BoW, HOG, and IP. The testing was carried out using the publicly available AT&T face dataset. Every individual subject consists of ten pictures, each with a different facial affirmation and illumination, as well as the image dimensions are unified as 92-by-112 pixels with PGM formats. With successive BoW, HOG, and IP, SVM achieved recognition accuracy of 97.00%, 96.00%, and 98.00%. With successive BoW, HOG, and IP, CNN accomplished recognition accuracy of 94.00%, 99.00%, as well as 99.50%. With successive BoW, HOG, and IP, ANN accomplished recognition accuracy of 96.00%, 99.00%, and 99.50%. The innovative results show that the IP with ANN approach surpassed the other strategies[15].

V.CONCLUSION

In Various types of attacks could be made against face authentication systems if a face unlock method is used has been covered in this review study. We have also seen many descriptions, their benefits and drawbacks, along their characteristics. And also how face recognition with LBP is more precise and effective. The many face spoof detection techniques now in use are also covered in this review study. Additionally, image distortion research and Spoof Face Detection utilizing Moiré network analysis are presented. The suggested methodology is examined in relation to several IoT apps. As a result, one of the finest methods for biometric authentication is face detection. LBP is also more resistant to changes in lighting & positions. As a result, spoofing could be recognized utilizing the Moiré pattern employing LBP in conjunction with an image distortion analysis algorithm.

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